## LISTING OF THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Claims 1-55 (Canceled)**

**Claim 56 (Currently Amended)**

An apparatus for mixing a first fluid with a second fluid, the apparatus comprising:

a fluid delivery system for transporting the first fluid to a mixing region;

a duct which defines a flow path for the second fluid through the mixing region; and

a fluid contactor which forms a flow path for the first fluid from which the first fluid is delivered into the duct ~~in~~ with a desired flow distribution,

wherein the fluid contactor includes:

an inlet coupled to receive the first fluid from the fluid delivery system; and

a plurality of outlet orifices providing fluid communication between the flow path in the fluid contactor and the interior of the duct through which the first fluid is delivered into the second fluid, and

wherein the fluid contactor, and one or more of the spatial locations~~, spatial distribution~~ of areal density, size, and orientation of the orifices are configured in accordance with selected parameters characterizing the first and/or second fluid to achieve the desired distribution of the first fluid in the second fluid.

**Claim 57 (Previously Presented)**

The apparatus of claim 56, wherein said fluid delivery system comprises a manifold delivering fluid to multiple fluid contactors.

**Claim 58 (Previously Presented)**

The apparatus of claim 57, wherein said fluid contactor comprises a plurality of curvilinear segments extending transversely to the second fluid flow path in the duct.

**Claim 59 (Currently Amended)**

The apparatus of claim 58, wherein one of said fluid contactor segments ~~are~~ is

positioned ~~sequentially~~ downstream of ~~each other in~~another fluid contactor segment relative to the flow path of the second fluid.

**Claim 60 (Previously Presented)**

The apparatus of claim 56, wherein the first fluid comprises a liquid, the second fluid comprises a gas, and wherein the orifices and the first fluid delivery system are configured so that a prescribed portion of the first fluid evaporates in the second fluid within the duct.

**Claim 61 (Previously Presented)**

The apparatus of claim 60, wherein the prescribed portion of the first fluid evaporates within a prescribed distance from the fluid contactor orifices.

**Claim 62 (Currently Amended)**

The apparatus of claim 60, wherein the ~~prescribed portion of the~~ first fluid delivery system is configured to control one of the delievery pressure and/or the flow rate of the first fluid in~~evaporates within a prescribed distance downstream from~~ the fluid contactor ~~orifices~~.

**Claim 63 (Previously Presented)**

The apparatus of claim 56, wherein the fluid delivery system further comprises a vibration generator configured to vibrate the fluid contactor.

**Claim 64 (Previously Presented)**

The apparatus of claim 63, wherein the vibration generator vibrates the fluid contactor in a direction generally perpendicular to the axes of most of the orifices.

**Claim 65 (Currently Amended)**

The apparatus of claim 56, wherein the fluid delivery system further comprises a high voltage power supply connected and configured to establish an electric field which modifies the flow of the first fluid ~~through~~ delivered by said orifices.

**Claim 66 (Currently Amended)**

The apparatus of claim 65, wherein the mean magnitude of the applied high voltage is

within a desired range to reduce the cross sectional area of the first fluid ~~as~~ after it passes through said orifices without causing an arc.

**Claim 67 (Previously Presented)**

The apparatus of claim 65, wherein the power supply is configured to provide a fluctuating voltage within a prescribed range to oscillate the delivered first fluid flow.

**Claim 68 (Previously Presented)**

The apparatus of claim 56, wherein the areal density of said plurality of orifices is at least 100,000 per square meter of duct cross sectional area.

**Claim 69 (Previously Presented)**

The apparatus of claim 56, wherein said plurality of orifices have an average diameter of less than about 80 microns.

**Claim 70 (Currently Amended)**

The apparatus of claim 56, wherein a portion of said fluid contactor comprises a tubular member configured to form a three dimensional curvilinear structure having a plurality of curvatures~~of varying curvature along its length~~.

**Claim 71 (Previously Presented)**

The apparatus of claim 56, wherein said fluid contactor comprises a flexible manifold for connecting said fluid delivery system to said plurality of orifices.

**Claim 72 (Previously Presented)**

The apparatus of claim 56, wherein said fluid contactor comprises:

at least one curvilinear tubular member through which the first fluid is delivered, and which has an axis of elongation that extends in a direction approximately parallel to at least a portion of the flow path of the second fluid; and

at least one manifold that connects said tubular member to the fluid delivery system.

**Claim 73 (Previously Presented)**

The apparatus of claim 56, wherein said fluid contactor comprises at least one curvilinear tube extending transversely to the second fluid flow path.

**Claim 74 (Previously Presented)**

The apparatus of claim 56, wherein said orifices are configured to deliver the first fluid into the flow path of the second fluid with a non-uniform distribution transverse to the second fluid flow path.

**Claim 75 (Previously Presented)**

The apparatus of claim 56, wherein some orifices have a longitudinal axis that is oblique to a local longitudinal axis of the fluid contactor.

**Claim 76 (Currently Amended)**

The apparatus of claim 56, wherein said orifices are configured with a non-uniform spatial distribution of orientation to deliver the first fluid into the ~~flow path of the~~ second fluid with a non-uniform flow distribution transverse to the second fluid flow path.

**Claim 77 (Currently Amended)**

The apparatus of claim 56, wherein said orifices are configured with a non-~~uniform size distribution~~spatial distribution of size to deliver the first fluid into the flow path of the second fluid with a non-uniform flow distribution transverse to the second fluid flow path.

**Claim 78 (Currently Amended)**

The apparatus of claim 56, wherein said orifices are configured with a non-uniform spatial distribution of areal density~~orientation~~ to deliver the first fluid into the flow path of the second fluid with a non-uniform distribution transverse to the second fluid flow path.

**Claim 79 (Currently Amended)**

The apparatus of claim 56, wherein said orifices are configured to deliver the first fluid into the flow path of the second fluid, such that the ratios of the mass flow rate or the volume flow rate of the first fluid to the mass flow rate or the volume flow rate, respectively, of the

second fluid at multiple locations along a curvilinear path transverse to the second fluid flow path ~~is~~ are non-uniform.

**Claim 80 (Currently Amended)**

The apparatus of claim 56, wherein said orifices are configured to deliver the first fluid into the flow path of the second fluid such that the ratios of the mass flow rate or the volume flow rate of the first fluid to the mass flow rate or the volume flow rate, respectively, of second fluid at multiple locations along each of a plurality of distinct curvilinear paths transverse to the second fluid flow path ~~is~~ are non-uniform.

**Claim 81 (Previously Presented)**

The apparatus of claim 56, wherein the fluid contactor has a streamlined cross-section with respect to the flow path of the second fluid.

**Claim 82 (Previously Presented)**

The apparatus of claim 56, wherein the fluid contactor comprises a thin walled sheet attached to a structural member and wherein the orifices are formed in the thin walled sheet.

**Claim 83 (Previously Presented)**

The apparatus of claim 56, wherein the fluid contactor comprises a wall with thinner portions with orifices configured in said thinner portions.

**Claim 84 (Currently Amended)**

A method for mixing a first fluid with a second fluid, the method comprising:

providing a fluid delivery system for transporting the first fluid to a mixing region;

providing a duct which forms a flow path for the second fluid through the mixing region;

providing a fluid contactor which forms a flow path for the first fluid;

wherein the fluid contactor includes:

an inlet for receiving the first fluid from the fluid delivery system; and

a plurality of orifices providing fluid communication between the flow path in the fluid contactor and the second fluid within the duct;

controlling the delivery pressure and/or the flow rate of the first fluid in the fluid contactor;

configuring the fluid contactor and one or more of the ~~location~~spatial distributions of areal density, orientation, ~~spatial distribution,~~ and size the outlet orifices in accordance with selected parameters characterizing the first and/or second fluid to achieve a desired distribution of the first fluid in the second fluid; and

delivering the first fluid into the second fluid flow path through the outlet orifices.

**Claim 85 (Previously Presented)**

The method of claim 84, wherein the mass flow rate or the volume flow rate of the first fluid as delivered into the second fluid is controlled such that the first fluid is non-uniformly distributed transversely to the flow path of the second fluid.

**Claim 86 (Previously Presented)**

The method of claim 84, wherein the pressure of the first fluid as delivered into the second fluid is controlled such that the first fluid is non-uniformly distributed transversely to the flow path of the second fluid.

**Claim 87 (Previously Presented)**

The method of claim 84, wherein the distribution of the mass flow rate or the volume flow rate of the first fluid as delivered into the second fluid is controlled such that the first fluid is uniformly distributed transversely to the flow path of the second fluid.

**Claim 88 (Previously Presented)**

The method of claim 84, wherein the pressure of the first fluid as delivered into the second fluid is controlled such that the first fluid is uniformly distributed transversely to the flow path of the second fluid.

**Claim 89 (Previously Presented)**

The method of claim 84, wherein the fluid contactor is configured by positioning an orifice to achieve a desired distribution of the first fluid in the second fluid along a transverse direction to the flow path of the second fluid.

**Claim 90 (Previously Presented)**

The method of claim 84, wherein the first fluid comprises a liquid and wherein at least a portion of the first fluid is evaporated after delivery into the second fluid.

**Claim 91 (Previously Presented)**

The method of claim 90, wherein the delivery of the first fluid is controlled along a transverse direction to the flow path of the second fluid to achieve a desired distribution of evaporated first fluid.

**Claim 92 (Previously Presented)**

The method of claim 84, wherein the step of controlling the delivery pressure and/or the flow rate of the first fluid in the fluid contactor comprises:

determining the mass or volume flow of the second fluid; and

adjusting the flow of the first fluid to achieve a desired ratio of the mass or volume flow of the first fluid to the mass or volume flow respectively of the total fluid flow in the duct.

**Claim 93 (Previously Presented)**

The method of claim 92, wherein the ratio of the mass or volume flow of the first fluid to the mass or volume flow respectively of the total fluid flow, is controlled to vary according to a position within the duct.

**Claim 94 (Currently Amended)**

The method of claim 84, wherein the step of controlling the delivery pressure and/or the flow rate of the first fluid in the fluid contactor comprises:

monitoring a fluid temperature distribution ~~of the fluids~~ at a location in the duct; and

adjusting the delivery of the first fluid into the second fluid to achieve a desired temperature distribution in the duct.

**Claim 95 (Previously Presented)**

The method of claim 94, wherein a portion of the first fluid is evaporated in the duct to achieve the desired temperature distribution.